

Remarks

Responsive to the Office action mailed February 22, 2006, Applicants provide the remarks herein. Reexamination and allowance of the subject application are respectfully requested.

Claims 1 and 4 have been amended herein to replace the phrase “and the other vinyl monomer” with –and another vinyl monomer–, thereby providing proper antecedent basis for vinyl monomer. This amendment is not made for reasons of patentability, and is made merely for the purpose of form. Thus, no estoppel effect, as may be applied by *Festo* or its progeny, should be applied to the claims. No new matter has been added to the subject application as a result of the changes made thereto.

Claims 1-5 were rejected under 35 USC §103(a) as being obvious over Masuda et al. (US 6,861,471).

The claimed invention is directed at an acrylic-modified chlorinated polyolefin resin and a method for making the same. Particularly, in independent claim 1, Applicants claim:

1. A method for preparing an acrylic-modified chlorinated polyolefin resin, which comprises graft-copolymerizing an acid-modified chlorinated polyolefin resin with a monomer mixture containing a (meth)acrylate ester monomer having one hydroxyl group and another vinyl monomer in the presence of a cyclic ether compound. (Emphasis added)

Similarly, in independent claim 4, Applicants claim:

4. An acrylic-modified chlorinated polyolefin resin obtained by graft-copolymerizing an acid-modified chlorinated polyolefin resin with a monomer mixture containing a (meth)acrylate ester monomer having one hydroxyl group and another vinyl monomer in the presence of a cyclic ether compound. (Emphasis added)

Consistent with each of the independent claims, the claimed invention requires a single graft-copolymerization step, in which an acid-modified chlorinated polyolefin

resin is graft-copolymerized with a monomer mixture including both a (meth)acrylate ester monomer having on hydroxyl group and another vinyl monomer. In addition to requiring a single graft-copolymerization with a mixture of two monomers, the claimed invention also requires that the graft-copolymerization take place in the presence of a cyclic ether compound.

By contrast to the claimed invention, Masuda et al. teach a multi-step process including, in part, first linking a (meth)acrylic ester having one hydroxyl group to an acid-modified chlorinated polyolefin. After the (meth)acrylic ester and the polyolefin have been linked, Masuda et al. teach to then graft copolymerize (meth)acrylic acid monomers with the foregoing reaction product. For example, Masuda et al. disclose:

“1. A coating composition for polyolefin resins, comprising a resin obtained by graft-copolymerizing at least one member selected from the group consisting of an α , β -unsaturated carboxylic acid and an acid anhydride thereof with at least one member selected from the group consisting of polypropylene and a propylene- α -olefin copolymer, chlorinating the graft copolymer to give an acid-modified chlorinated polyolefin, linking a (meth)acrylic ester having one hydroxyl group to the polyolefin via an ester linkage, and then graft-copolymerizing (meth)acrylic acid monomers with the polyolefin.” (Col. 2, 1 10-20, emphasis added)

While the claimed invention and the disclosure of Masuda et al. relate to similar materials produced using similar initial materials, Applicants respectfully submit that the claimed invention differs significantly for the teachings of Masuda et al. As recognized in the instant application, “compatibility and solution stability are improved by an acrylic-modified chlorinated polyolefin obtained by bonding an acid modified chlorinated polyolefin with a hydroxyl group containing (meth)acrylate ester via an ester bond, thereby to introduce a double bond into the acid-modified chlorinated polyolefin, and graft-copolymerizing a (meth)acrylic acid monomer.” Paragraph [0007] of the application as published. However, the instant application goes on to point out that, while the compatibility and solution stability may be improved, the material has many undesirable features. Specifically, the instant application notes:

“However, a coating composition for polyolefin material containing a resin obtained by the method for preparing an acrylic-modified chlorinated polyolefin disclosed in Japanese Patent Application, First Publication No. 2002-309161 has a fatal defect of properties of a coating composition, that is, phase separation occurs during the storage of the coating composition because of poor stability of the composition itself. Furthermore, since all components of the composition cannot be uniformly dissolved and lumps remain, “seeding” occurs in a coating film made of the composition and the coating film has poor appearance.” (Paragraph 8, emphasis added)

The claimed invention, at least in part, overcomes at least a portion of these deficiencies of the prior coating compositions. Particularly, the one step graft-copolymerization with a monomer mixture of the claimed invention provides superior effects on high-temperature and low temperature stability of the resin, as detailed in Table 2 of the subject application. In addition to the one step graft-copolymerization, the superior effects achieved consistent with the claimed invention are also related to the preparation of the material via a one step reaction in a cyclic ether compound. Specifically, Example 1-8, detailed in paragraphs [0050] through [0057] of the published application, were prepared in 1, 3 dioxolane as a cyclic ether compound. By contrast, Comparative Examples 1 and 2, detailed in paragraphs [0058] and [0059] of the published application, were prepared without the use of cyclic ether, instead using toluene. In the case of Comparative Example 2, 1, 3 dioxolane was added later in the reaction.

As demonstrated in the results presented in Table 2, neither of the Comparative Examples exhibit good stability as compared to Examples 1 through 8. Applicants respectfully submit that the superior performance of Examples 1 through 8, as compared to Comparative Examples 1 and 2, clearly demonstrates that the one step reaction in a cyclic ether compound provides great improvements over multi-step reactions in solvents other than cyclic ether compounds. In fact, as demonstrated by Comparative Example 2, even the subsequent addition of cyclic ether compounds fails to achieve the full benefits of the claimed invention.

Contrary to the claimed invention, Masuda et al. teach the use of various typical solvents for carrying out the reactions between the acid-modified chlorinated polyolefin and the (meth)acrylic ester having one hydroxyl group, and the subsequent graft-copolymerization between the reaction product thereof and a (meth)acrylic acid monomer. The recited exemplary solvents include "benzene, toluene, xylene, cyclohexane, methylcyclohexane, methyl ethyl ketone, methyl isobutyl ketone, ethyl acetate, tetrahydrofuran, propylene glycols, etc. Col 4, l. 35-39.

In this regard, it is noted that Masuda et al. teach, in Example 1, not only a multi-step graft copolymerization, first with a (meth)acrylic ester having one hydroxyl group, and then graft-copolymerizing with a (meth)acrylic monomer, but also that the reaction takes graft copolymerization takes place using xylene. Specifically, Example 1 is as follows:

"In a four-necked flask equipped with a stirrer, condensor, thermometer and dropping funnel, 15 weight parts of the acid-modified chlorinated polyolefin obtained in Production Example 1 was dissolved in 45 weight parts of xylene, followed by heating at a temperature of 120° C. for 1 hour. Thereafter, 2 weight parts of 2-hydroxyethyl acrylate was added into the flask, the contents of which were then continuously stirred to facilitate esterification. Subsequently, into this was dropped over a period of 3 hours a solution in which 30 weight parts of cyclohexyl methacrylate, 30 weight parts of methyl methacrylate, 20 weight parts of lauryl methacrylate, 3 weight parts of methacrylic acid, 105 weight parts of xylene and 1.7 weight parts of t-butyl peroxy-2-ethyl hexanoate were mixed well, and thereafter the reaction was continued for 5 hours with sufficient stirring, followed by cooling." (Col. 7, l. 5-24, emphasis added)

The remaining examples disclosed by Masuda et al. similarly teach a multi-step process taking place in xylene.

In summary, contrary to the express teachings of Masuda et al., the invention of claims 1-5 requires, in part, a one step graft-copolymerization of an acid-modified chlorinated polyolefin resin with a monomer mixture containing a (meth)acrylate ester monomer having on hydroxyl group and another vinyl monomer in the presence of a cyclic ether compound, resulting in superior performance over the multi-step reaction

taught by Matsuda et al. Additionally, Matsuda et al. fails to teach, or even suggest the use of cyclic ether compounds. In view of the foregoing, Applicants respectfully submit that the invention of claims 1-5 is non-obvious over Matsuda et al. Withdrawal of the rejection of claims 1-5 is respectfully requested in view of the remarks herein.

Having overcome all of the outstanding rejections, Applicants respectfully submit that the application is now in condition for allowance. An early allowance of the subject application is respectfully solicited.

In the even of any fee deficiencies, or that additional fees are payable, please charge our Deposit Account No. 50-2121 as necessary.

Respectfully submitted,

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